Effective Teaching with Demonstrations:

Result Demonstrations-

I chose this method of demonstration in an effort to provide better understanding of the principle of how atmospheric pressure is an integral part of the operation of a hydraulic pump in an automotive engine or automatic transmission.

I made the demonstration to an automatic transmission class containing 14 students. The object of the demonstration was a one gallon metal container that contained approximately 3 fluid ounces of water. Using a propane torch I heated the container until steam boiled out of the opening on top. At that time I removed the heat source and quickly placed the cap on the container sealing it and placed it on a table in front of the students. Very quickly the can began to implode as the can cooled and the trapped water vapor inside started to condense. The heated water vapor had pushed most of the air out of the can while it was boiling and by sealing the can as it was removed from the heat source no air was able to re-enter the container. As the water vapor cooled and condensed the air pressure inside the container was relatively low compared to atmospheric pressure on the outside of the container causing the container to crush inward as a result.

The students, while knowing the definition of atmospheric pressure, had not seen what would happen as the result of differences in pressure. I asked the class for their observations regarding the demonstration.

Some thought the implosion of the can had to do with the heating and cooling of the can. Others thought it had something to do with the boiling water. After a number of observations the class starting pulling together what was happening to the can.

Then we started to discuss how a hydraulic pump works and why it depends on atmospheric pressure to literally push the hydraulic fluid toward a low pressure created by the pump gears.

My hope was they would better understand the interaction of atmospheric pressure and other low pressure situations to cause fluid to move.

All in all the result was a success.